

(19) World Intellectual Property Organization
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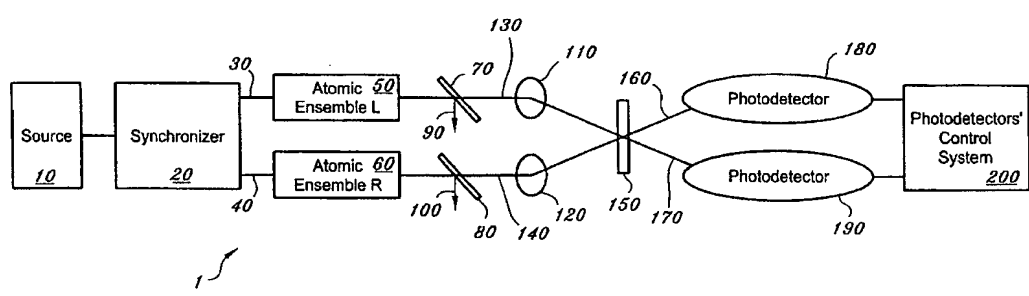
(43) International Publication Date
4 December 2003 (04.12.2003)

PCT

(10) International Publication Number
WO 03/101013 A1

- (51) International Patent Classification⁷: **H04B 10/00**
- (21) International Application Number: PCT/US02/15135
- (22) International Filing Date: 20 May 2002 (20.05.2002)
- (25) Filing Language: English
- (26) Publication Language: English
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- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Declaration under Rule 4.17:**
— of inventorship (Rule 4.17(iv)) for US only
- Published:**
— with international search report
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: LONG-DISTANCE QUANTUM COMMUNICATION



(57) Abstract: The invention provides systems and methods enabling high fidelity quantum communication over long communication channels even in the presence of significant loss in the channels comprising laser manipulation of quantum correlated atomic ensembles using linear optic components (110, 120), optical sources of low intensity pulses (10), beam splitters (150), single-photon detectors (180, 190) requiring only moderate efficiencies. The invention provides fault-tolerant entanglement generation, connection, using a sequence of steps that each provide built-in entanglement purification and are each resilient to the realistic noise. The invention relies upon collective rather single particle excitations in atomic ensembles and result in communication efficiency scaling polynomially with the total length of a communication channel.



WO 03/101013 A1

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/15135

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H 04 B 10/00

US CL : 359/112

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 359/112

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
USPTO, US-PG PUBS, IBMTDB, EPO, JPO, DERWENT**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,339,182 A (Kimble et al.) 16 August 1994 (16.08.1994), see entire document.	1-56
Y	US 5,418,905 A (Rarity et al.) 23 May 1995 (23.05.1995), see entire document.	1-56
Y	US 5,243,649 A (Franson) 07 September 1993 (07.09.1993), see entire document.	1-56

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Further documents are listed in the continuation of Box C.

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See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

26 July 2002 (26.07.2002)

Date of mailing of the international search report

20 AUG 2002

Name and mailing address of the ISA/US

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